

## **ENERGY EFFICIENCY IN IOWA'S SCHOOLS**

***Information was provided by school districts that are members of the Iowa Schools Buildings and Grounds Association (ISBGA). In summary, most school districts have converted incandescent and T12 fluorescent lighting to more energy efficient T8 fluorescent lighting systems, replaced inefficient boiler systems with geothermal HVAC systems, installed motion sensors to turn lights off, installed more efficient plumbing fixtures, use energy management systems to control heating, cooling and lighting, and installed LED exit lighting systems that use a fraction of energy. Some school districts installed more energy efficient boiler systems when geothermal was not feasible. Most school districts have worked with their utility company to do energy audits and apply for energy rebates. One school district collaborated with the city to install a wind generator to supply electricity. Ten school districts in Iowa operate wind turbines.***

### **AMES CSD:**

- Replaced all incandescent lighting with energy efficient compact fluorescents
- Converting all T12 lamps with energy efficient T8 lamps and electronic ballasts
- Replacing all fluorescent and incandescent exit lights with new LED style that uses a fraction of a watt and require no maintenance
- At new middle school:
  - ✓ Installed motion sensors to turn lights off
  - ✓ Installed timers to turn off all lights at night
  - ✓ Use energy management system that is programmed to control heating hot water so that when the building is empty, the set points are reduced
  - ✓ Installed geothermal heating/cooling system
- At the high school, installed a small boiler designed solely for the green house. Before the new boiler was installed, the school district was unable to reduce the set point on the hot water boiler system for that wing of the high school to keep the plants alive in the green house. With the separate green house boiler, the district can now reduce the set points on the large building boiler.
- The school district uses the I-JUMP program from IASB to save on natural gas costs. This IASB-sponsored program was designed in 1997 by an advisory committee with the assistance of energy and utility marketing professionals, including the energy advisor, Latham & Associates. IJUMP relies on these energy experts to handle the educational aspects of the program and to purchase and deliver natural gas. Start-up, implementation and educational costs are covered by a revolving loan from the Iowa Department of Natural Resources. IJUMP's utility partners—Alliant Utilities, MidAmerican Energy, Aquila and United Cities Gas Co.—have developed IJUMP pilot programs and adjusted tariff requirements to increase savings for school districts.

### **BOONE CSD:**

- Replaced T12 fluorescent lighting with T8 in classrooms and hallways
- Installed T8 lighting in gymnasiums (increases energy savings by reducing KW hour usage)
- Installed a pool cover to retain heat
- Installed HVAC computer programming to time heat / cool usage and night setbacks
- Built a new middle school with geothermal heating and cooling

### **CLINTON CSD:**

- Alliant Energy will be doing an energy audit for the school district to determine energy efficient projects for the school district

### **COUNCIL BLUFFS CSD:**

Projects done in conjunction with The Weidt Group from Minneapolis who provide assistance in designing energy efficient building systems and Mid-American Energy who fund the grants for The Weidt Group and energy rebates to the district.

In 2004, the architect/engineer team hired by the district earned an award from Mid-American Energy for the highest percentage of energy savings for projects in the Commercial New Construction Program.

#### **Geothermal HVAC Systems**

- Installed geothermal closed loop heat pump HVAC systems with roof mounted energy recovery units since 2001 in four elementary schools
- New systems in progress for one elementary, one high school, with future plans to add new geothermal systems into the other two high schools and three more elementary schools
- At Longfellow Elementary, reduced energy consumption but also reduced in half the student and staff absenteeism due to illness as compared with the old HVAC system

#### **Lighting**

- Added new T8, 3 level lighting in each classroom and T8 lighting in hallways

#### **Windows**

- Installed energy efficient thermo-pane windows with low E coating

### **DAVENPORT CSD:**

Davenport Community School District has been recognized nationally as one of the leading school districts for energy conservation. Davenport CSD was recently named by the Environmental Protection Agency in Washington as an ENERGY STAR Partner of the Year for energy management. Davenport CSD was also named in 1998 as the national educational winner of a similar award from the EPA and may have been the only school district nationally to receive the award twice. Davenport CAS also received the award in Washington just this month and was recognized along side such corporations as Ford Motor Company and Home Depot. Last fall, Bill Good, Director of Operations for Davenport CSD, received the Pinnacle of Excellence award from the Association of School Business Officials International (their highest award) for Davenport's energy conservation program. Mr. Good had the opportunity to receive the award in Pittsburg and spoke to several thousand school business officials. Davenport CSD's efforts in energy efficiency:

- Presented in Washington DC, Des Moines, Davenport, and Solon in the past few months. Presented in Toronto, Canada at the 2007 Association of School Business Officials annual meeting.
- Previously (2004), Davenport received regional awards from the EPA for energy efficiency.
- 27 of Davenport's 29 schools qualify for ENERGY STAR designation. (There might only be one other building in Iowa with such a designation).
- An application was sent to Governor Culver's office offering to serve on the state energy council, but was not accepted.
- Developed case studies with MidAmerican Energy (local utility) and the Trane Company.
- Davenport Schools will be mentioned in Forbes magazine as well as other national building publications.
- Based upon Iowa Association of School Boards data, all of Davenport's elementary schools are well below the state average for energy consumption.
- Median amount spent per student (K-12) on energy in '04-'05 - \$181.53 (American School and University Magazine December 2005)  
Davenport Schools - \$88.46 ('04-'05)
- Since 2003, the Davenport Community Schools have saved \$1.5m dollars.

Davenport Community School District is unique because it focuses on energy conservation measures for preserving energy and valuable resources for future generations. Our current and future students must depend upon us to be responsible and we owe it to them. Davenport CSD is very proud of it's energy accomplishments and is thankful that the Governor is taking interest in saving our precious resources.

**FOREST CITY CSD:****Wind Energy**

- In 1999, a student's research project for high school physics class resulted in the school district cooperating with the City of Forest City to erect a wind turbine to save electrical energy

**Geothermal HVAC Systems**

- Converted elementary and middle school buildings to geothermal heating

**Other Energy Saving Measures**

- Touch-less water fixtures in restrooms
- Motion sensors in some areas to control lighting
- Modern T-5 lighting in gymnasiums
- Airlock for entries to avoid excessive heat or cooling loss

**MARSHALLTOWN CSD:**

- Installed a geothermal heating/cooling system at Rogers Elementary and currently bidding a similar retrofit at Woodbury Elementary
- For buildings not conducive for geothermal conversion, the district is utilizing new controls and efficiency rated heating plant equipment

**PELLA CSD:**

- Installed foam roofs with +R5 (depending how much foam installed)
- Replaced T12 lighting with T8 lighting systems in all classrooms, hallways, and offices (savings payback is 2-3 ½ years)
- Built new elementary school with high energy efficient lighting, motors, automatic light switches, and geothermal HVAC system

**SOUTHEAST POLK CSD:**

- New high school under construction will have geothermal HVAC
- Participated in the Energy Education program for past five years that has reduced energy costs by \$1,512,000

**URBANDALE CSD:****New Buildings**

- Energy efficiency planned in the design of buildings with a payback of less than 10 years

**Existing Buildings**

- High efficiency Boilers (up to 96% efficient)
- DDC controls
- T-8 lighting technology
- Converting from T-12 to T-8 lighting
- LED exit lighting
- Use of an Energy Auditor to make recommendations for energy efficiency in the district

**THE IOWA ENERGY BANK**

The Iowa Energy Bank program through the Department of Natural Resources is a common-sense approach to saving money through energy efficiency. Whether a school, local government, college, or hospital, any organization can benefit from the financing assistance and expert advice available through the Energy Bank. The Energy Bank is designed to help Iowa organizations decrease the amount of energy they consume – thus lowering energy costs – through building improvements.

The key steps to achieving energy efficiency are: 1) Determine current energy use and potential savings through a building energy survey, energy audit, and engineering analysis; 2) Create a financing package through the Energy Bank; 3) Make improvements; and 4) Track savings through energy accounting and facility monitoring.

Common energy efficiency improvements include:

- Fluorescent lamps and ballast replacement
- Motor replacement
- Exit sign replacement
- Pipe insulation
- Sensors for water faucets and lavatories
- Lighting controls
- Night setback
- Water heater blankets
- Low-flow shower heads
- Low volume toilets
- Biomass fuels
- Wind energy
- Ground-source heat pumps
- Windows
- Insulation
- Doors

Establishing a financial package for efficiency improvements is the foundation for Energy Bank projects. Financing can be completely customized to the organization's budget, capital needs, funding sources, and cash flow. The **Department of Natural Resources** brings together financial consultants to help negotiate the best rates and terms on a loan package.

### **LEED Green Building Rating System**

The LEED (Leadership in Energy & Environmental Design) Green Building Rating System is a voluntary standard that defines high performance green buildings – which are healthier, more environmentally responsible, and more profitable structures. Developed by the U.S. Green Building Council, a nonprofit organization, LEED addresses defined markets with the commercial and residential building industries through individualized systems, including:

- New Construction (LEED-NC)
- Existing Buildings (LEED-EB)
- Commercial Interiors (LEED-CI)
- Core & Shell Development (LEED-CS)
- Neighborhood Development (LEED-ND)
- Homes (LEED-H)
- Schools (proposed)

LEED certification validates to occupants, market, and community that the building is a green structure. Certification also benchmarks the building's performance over time. To evaluate a green building under the LEED rating system, points are awarded for achievements in six categories: sustainable sites, water efficiency, energy and atmosphere, material and resources, indoor air quality, and innovation and design process.

Four progressive levels of LEED certification – **Certified, Silver, Gold, and Platinum** – measure achievements in green building based on the number of points awarded to a project.

The three steps to certification are: 1) Project registration; 2) Technical support; and 3) Building certification.

### HELPFUL WEBSITES FOR ENERGY EFFICIENCY

<http://www.usgbc.org> U.S. Green Building Council (USGBC)

<http://www.iowadnr.com/energy/ebank/index.html> The Iowa Energy Bank

<http://www.midamericanenergy.com/ee> MidAmerican Energy

<http://www.energy.iastate.edu> Iowa Energy Center

<http://www.ase.org> Alliance to Save Energy Green Schools Project

<http://www.doe.erec@nciinc.com> EnergySmart Schools Department of Energy

<http://www.greenschoolproject.com/> Green School Project

<http://www.epa.state.il.us/p2/green-schools/green-schools-checklist.pdf>  
Green Schools Checklist

[http://www.mtpc.org/rebates/green\\_schools.htm](http://www.mtpc.org/rebates/green_schools.htm) Renewable Energy Trust

<http://www.greenschools.net/> The Green Schools Initiative

<http://www.nesea.org/buildings/greenschoolsresources.html>  
Building Green Schools Resource List

<http://globalgreen.org/greenbuilding/> Global Green